

Appln. No.09/890,297
Suppl. Amdt. Dated May 19, 2003
Reply to Office action of February 20, 2003

Attorney File No.: CE0253 US

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims

Claims 1-53 (cancelled)

Claim 54 (previously added): A process for purifying an albumin solution, the process comprising

- C1
- (1) subjecting the albumin solution to cation exchange chromatography in the negative mode with respect to the albumin in order to yield an albumin-containing cation exchange product;
 - (2) subjecting the albumin-containing cation exchange product, with or without intervening purification steps, to anion exchange chromatography to yield an albumin-containing anion exchange product; and
 - (3) placing the albumin-containing anion exchange product, without further purification, into a final container for therapeutic use

Claim 55 (previously added): A process according to Claim 54 wherein the initial albumin solution contains glycosylated albumin and the glycosylated albumin is bound during the said cation exchange step.

Claim 56 (previously added): A process according to Claim 54 wherein the cation exchange step utilises a matrix which comprises immobilised sulfopropyl substituents as cation exchangers.

Claim 57 (previously added): A process according to Claim 54 wherein the initial albumin solution has a pH of 4.5-6.0.

Claim 58 (previously added): A process according to Claim 54 wherein the initial albumin solution has an albumin concentration of 10-250g.L⁻¹.

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Claim 59 (previously added): A process according to Claim 54 wherein the initial albumin solution has an octanoate ion concentration of 2-15mM.

Claim 60 (previously added): A process according to Claim 54 wherein the initial albumin solution has an octanoate ion concentration of 5-10mM.

Claim 61 (previously added): A process according to Claim 54 wherein prior to the cation exchange step the albumin solution undergoes at least one step selected from the group consisting of: (i) pH-adjustment; (ii) concentration; (iii) diafiltration; and (iv) conditioning by addition of a fatty acid.

Claim 62 (previously added): A process according to Claim 61 wherein prior to the cation exchange step the albumin solution undergoes conditioning by addition of an octanoate salt.

Claim 63 (previously added): A process according to Claim 54 wherein the anion exchange step utilises a matrix which comprises immobilised dialkylaminoalkyl substituents as anion exchangers.

Claim 64 (previously added): A process according to Claim 54 wherein the anion exchange step is run in the negative mode with respect to the albumin.

Claim 65 (previously added): A process according to Claim 64 wherein the albumin solution which undergoes anion exchange chromatography has a pH of 4.0-5.2.

Claim 66 (previously added): A process according to Claim 64 wherein the albumin solution which undergoes anion exchange chromatography has a conductivity of less than $4.0\text{mS}\cdot\text{cm}^{-1}$.

Claim 67 (previously added): A process according to Claim 54 wherein the anion exchange step is run in positive mode with respect to the albumin.

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Claim 68 (previously added): A process according to Claim 67 wherein the albumin solution which undergoes positive mode anion exchange chromatography has a pH of 6.0-8.0.

Claim 69 (previously added): A process according to Claim 67 wherein the concentration of the albumin in the albumin solution which undergoes positive mode anion exchange chromatography is 10-100g.L⁻¹

Claim 70 (previously added): A process according to Claim 67 wherein the albumin solution which undergoes positive mode anion exchange chromatography has a conductivity of 1.0-1.5mS.cm⁻¹.

Claim 71 (previously added): A process according to Claim 67 wherein the albumin is eluted in the anion exchange step using a buffer comprising a compound having a specific affinity for albumin.

Claim 72 (previously added): A process according to Claim 71 wherein the buffer comprises 20-90mM phosphoric acid salt.

Claim 73 (previously added): A process according to Claim 67 wherein the albumin is eluted in the anion exchange step with a buffer of pH6.0-8.0.

Claim 74 (previously added): A process according to Claim 54 wherein, prior to the anion exchange step, the albumin solution undergoes at least one step selected from the group consisting of: buffer exchange; concentration; dilution; dialysis; diafiltration; pH-adjustment; treatment with a reducing agent; decolouration treatment; heating; cooling; and conditioning

Claim 75 (previously added): A process according to Claim 54 wherein the process is preceded by at least one step selected from the group consisting of: fermentation; primary separation; concentration; conditioning; cation exchange chromatography; anion exchange chromatography; and affinity chromatography.

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Claim 76 (currently amended): A process for purifying an albumin solution, the process comprising

- (1) subjecting the albumin solution to cation exchange chromatography in the negative mode with respect to the albumin in order to yield an albumin-containing cation exchange product;
- (2) subjecting the albumin-containing cation exchange product, with or without intervening purification steps, to anion exchange chromatography to yield an albumin-containing anion exchange product; and
- (3) placing the albumin-containing anion exchange product, without further purification, into a final container for therapeutic use,

wherein the albumin-containing anion exchange product is subjected to at least one step selected from the group consisting of buffer exchange; concentration; dilution; dialysis; diafiltration; pH-adjustment; treatment with a reducing agent; ~~decoloration treatment~~; heating; cooling; and conditioning, before being placed into the said final container.

Claim 77 (previously added): A process according to Claim 76 wherein the initial albumin solution contains glycosylated albumin and the glycosylated albumin is bound during the said cation exchange step.

Claim 78 (previously added): A process according to Claim 76 wherein prior to the cation exchange step the albumin solution undergoes at least one step selected from the group consisting of: (i) pH-adjustment; (ii) concentration; (iii) diafiltration; and (iv) conditioning by addition of a fatty acid.

Claim 79 (currently amended): A process for purifying an albumin solution, the process comprising

- (1) subjecting the albumin solution to anion exchange chromatography in order to yield an albumin-containing anion exchange product;
- (2) subjecting the albumin-containing anion exchange product, with or without intervening purification steps, to cation exchange chromatography run in the negative mode with respect to the albumin to yield an albumin-containing cation exchange product; and

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(3) placing the albumin-containing cation exchange product, without further purification, into a final container for therapeutic use, wherein the albumin-containing cation exchange product is subjected to at least one step selected from the group consisting of buffer exchange; concentration; dilution; dialysis; diafiltration; pH-adjustment; treatment with a reducing agent; ~~decoloration treatment~~; heating; cooling; and conditioning, before being placed into the said final container.

Claim 80 (previously added): A process according to Claim 79 wherein the initial albumin solution contains glycosylated albumin and the glycosylated albumin is bound during the said cation exchange step.

Claim 81 (previously added): A process according to Claim 79 wherein prior to the cation exchange step the albumin solution undergoes at least one step selected from the group consisting of: (i) pH-adjustment; (ii) concentration; (iii) diafiltration; and (iv) conditioning by addition of a fatty acid.

Claim 82 (previously added): A process for purifying an albumin solution, the process comprising the steps of:

- (i) subjecting an albumin solution to a cation exchange chromatography step run in positive mode with respect to the albumin;
- (ii) collecting an albumin-containing cation exchange eluate;
- (iii) subjecting the cation exchange eluate to an anion exchange chromatography step run in positive mode with respect to the albumin;
- (iv) collecting an albumin-containing anion exchange eluate;
- (v) subjecting the anion exchange eluate to an affinity chromatography step run in positive mode with respect to the albumin;
- (vi) collecting an albumin-containing affinity chromatography eluate;
- (vii) subjecting the affinity chromatography eluate to an affinity chromatography step run in negative mode with respect to the albumin and in positive mode with respect to glycoconjugates;
- (viii) collecting the albumin-containing affinity chromatography flow through;
- (ix) subjecting the affinity chromatography flow through to a cation exchange chromatography step run in negative mode with respect to the albumin;

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- (x) collecting the albumin-containing cation exchange flow through;
- (xi) subjecting the cation exchange flow through to an anion exchange chromatography step run in negative mode; and
- (xii) collecting the albumin-containing anion exchange flow through from step (xi).

Claim 83 (previously added): A process for purifying an albumin solution, the process comprising the steps of:

- CI
COO4.
- (i). subjecting an albumin solution to a cation exchange chromatography step run in positive mode with respect to the albumin;
 - (ii). collecting an albumin-containing cation exchange eluate;
 - (iii). subjecting the cation exchange eluate to an anion exchange chromatography step run in positive mode with respect to the albumin;
 - (iv). collecting an albumin-containing anion exchange eluate;
 - (v). subjecting the anion exchange eluate to an affinity chromatography step run in positive mode with respect to the albumin;
 - (vi). collecting an albumin-containing affinity chromatography eluate;
 - (vii). subjecting the affinity chromatography eluate to an affinity chromatography step run in negative mode with respect to the albumin and in positive mode with respect to glycoconjugates;
 - (viii). collecting the albumin-containing affinity chromatography flow through;
 - (ix). subjecting the affinity chromatography flow through to a cation exchange chromatography step run in negative mode with respect to the albumin;
 - (x). collecting the albumin-containing cation exchange flow through;
 - (xi). subjecting the cation exchange flow through to an anion exchange chromatography step run in positive mode; and
 - (xii). eluting from the anion exchange matrix an anion exchange eluate.

Claim 84 (previously added): A process according to Claim 82 wherein any of the said purification steps are optionally preceded or followed by at least one step selected from the group consisting of: buffer exchange; concentration; dilution; dialysis; diafiltration; pH-adjustment; treatment with a reducing agent; decolouration treatment; heating; cooling; and conditioning.

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Claim 85 (previously added): A process according to Claim 83 wherein any of the said purification steps are optionally preceded or followed by at least one step selected from the group consisting of: buffer exchange; concentration; dilution; dialysis; diafiltration; pH-adjustment; treatment with a reducing agent; decolouration treatment; heating; cooling; and conditioning.

Claim 86 (previously added): A process for purifying an albumin solution, the process comprising the steps of:

- CI
COO'd.
- (i) subjecting an albumin solution to a cation exchange chromatography step run in positive mode with respect to the albumin;
 - (ii) collecting an albumin-containing cation exchange eluate;
 - (iii) subjecting the cation exchange eluate to an anion exchange chromatography step run in positive mode with respect to the albumin;
 - (iv) collecting an albumin-containing anion exchange eluate;
 - (v) subjecting the anion exchange eluate to an affinity chromatography step run in positive mode with respect to the albumin;
 - (vi) collecting an albumin-containing affinity chromatography eluate;
 - (vii) subjecting the affinity chromatography eluate to an affinity chromatography step run in negative mode with respect to the albumin and in positive mode with respect to glycoconjugates;
 - (viii) collecting the albumin-containing affinity chromatography flow through;
 - (ix) subjecting the affinity matrix flow through to an anion exchange chromatography step run in negative mode with respect to the albumin;
 - (x) collecting the albumin-containing anion exchange flow through from step (ix);
 - (xi) subjecting the albumin solution purified by the anion exchange chromatography step to a cation exchange chromatography step run in negative mode with respect to the albumin; and
 - (xii) collecting the albumin-containing cation exchange flow through.

Claim 87 (previously added): A process for purifying an albumin solution, the process comprising the steps of:

- (i). subjecting an albumin solution to a cation exchange chromatography step run in positive mode with respect to the albumin;

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- CI
GDI
- (ii). collecting an albumin-containing cation exchange eluate;
 - (iii). subjecting the cation exchange eluate to an anion exchange chromatography step run in positive mode with respect to the albumin;
 - (iv). collecting an albumin-containing anion exchange eluate;
 - (v). subjecting the anion exchange eluate to an affinity chromatography step run in positive mode with respect to the albumin;
 - (vi). collecting an albumin-containing affinity chromatography eluate;
 - (vii). subjecting the affinity chromatography eluate to an affinity chromatography step run in negative mode with respect to the albumin and in positive mode with respect to glycoconjugates;
 - (viii). collecting the albumin-containing affinity chromatography flow through;
 - (ix). subjecting the affinity matrix flow through to an anion exchange chromatography step run in positive mode with respect to the albumin;
 - (x). eluting from the anion exchange matrix an anion exchange eluate;
 - (xi). subjecting the albumin solution purified by the anion exchange chromatography step to a cation exchange chromatography step run in negative mode with respect to the albumin; and
 - (xii). collecting the albumin-containing cation exchange flow through.

Claim 88 (previously added): A process according to Claim 86 wherein any of the said purification steps are optionally preceded or followed by at least one step selected from the group consisting of: buffer exchange; concentration; dilution; dialysis; diafiltration; pH-adjustment; addition of reducing agent; decolouration treatment; heating; cooling; and conditioning.

Claim 89 (previously added): A process according to Claim 87 wherein any of the said purification steps are optionally preceded or followed by at least one step selected from the group consisting of: buffer exchange; concentration; dilution; dialysis; diafiltration; pH-adjustment; addition of reducing agent; decolouration treatment; heating; cooling; and conditioning.

Claim 90 (previously added): A process for purifying an albumin solution, the process comprising

- (1) subjecting the albumin solution to anion exchange chromatography in order to

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- yield an albumin-containing anion exchange product;
- (2) subjecting the albumin-containing anion exchange product, with or without intervening purification steps, to cation exchange chromatography run in the negative mode with respect to the albumin to yield an albumin-containing cation exchange product; and
- (3) placing the albumin-containing cation exchange product, without further purification, into a final container for therapeutic use.

Claim 91 (previously added): A process according to Claim 90 wherein the initial albumin solution contains glycosylated albumin and the glycosylated albumin is bound during the said cation exchange step

CI
COO⁻
Claim 92 (previously added): A process according to Claim 90 wherein the cation exchange step utilises a matrix which comprises immobilised sulfopropyl substituents as cation exchangers.

Claim 93 (previously added): A process according to Claim 90 wherein the albumin solution that undergoes cation exchange chromatography has a pH of 4.5-6.0

Claim 94 (previously added): A process according to Claim 90 wherein the albumin solution that undergoes cation exchange chromatography has an albumin concentration of 10-250g.L⁻¹.

Claim 95 (previously added): A process according to Claim 90 wherein the albumin solution that undergoes cation exchange chromatography has an octanoate ion concentration of 2-15mM.

Claim 96 (previously added): A process according to Claim 90 wherein prior to the cation exchange step the albumin solution undergoes at least one step selected from the group consisting of: (i) pH adjustment; (ii) concentration; (iii) diafiltration; and (iv) conditioning by addition of a fatty acid.

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Claim 97 (previously added): A process according to Claim 96 wherein prior to the cation exchange step the albumin solution undergoes conditioning by addition of an octanoate salt.

Claim 98 (previously added): A process according to Claim 90 wherein the anion exchange step utilises a matrix which comprises immobilised dialkylaminoalkyl substituents as anion exchangers.

Claim 99 (previously added): A process according to Claim 90 wherein the anion exchange step is run in the negative mode with respect to the albumin.

Claim 100 (previously added): A process according to Claim 99 wherein the albumin solution which undergoes anion exchange chromatography has a pH of 4.0-5.2.

Claim 101 (previously added): A process according to Claim 99 wherein the albumin solution which undergoes anion exchange chromatography has a conductivity of less than $4.0\text{mS}\cdot\text{cm}^{-1}$.

Claim 102 (previously added): A process according to Claim 90 wherein the anion exchange step is run in positive mode with respect to the albumin

Claim 103 (previously added): A process according to Claim 102 wherein the albumin solution which undergoes positive mode anion exchange chromatography has a pH of 6.0-8.0.

Claim 104 (previously added): A process according to Claim 102 wherein the concentration of the albumin in the albumin solution which undergoes positive mode anion exchange chromatography is $10\text{-}100\text{g}\cdot\text{L}^{-1}$

Claim 105 (previously added): A process according to Claim 102 wherein the albumin solution which undergoes positive mode anion exchange chromatography has a conductivity of $1.0\text{-}1.5\text{mS}\cdot\text{cm}^{-1}$.

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Claim 106 (previously added): A process according to Claim 102 wherein the albumin is eluted in the anion exchange step using a buffer comprising a compound having a specific affinity for albumin.

Claim 107 (previously added): A process according to Claim 106 wherein the buffer comprises 20-90mM phosphoric acid salt.

Claim 108 (previously added): A process according to Claim 102 wherein the albumin is eluted in the anion exchange step with a buffer of pH6.0-8.0.

C1
CDD4.
Claim 109 (previously added): A process according to Claim 90 wherein, prior to the cation exchange step, the albumin solution undergoes at least one step selected from the group consisting of: buffer exchange; concentration; dilution; dialysis; diafiltration; pH-adjustment; treatment with a reducing agent; decolouration treatment; heating; cooling; and conditioning.

Claim 110 (currently amended): A process according to Claim 90 wherein the process is preceded by at least one step selected from the group consisting of: fermentation; primary separation; ~~concentration~~; concentrate conditioning; cation exchange chromatography; anion exchange; and affinity chromatography.

Claim 111 (previously added): A process for purifying an albumin solution, the process comprising

- (1) subjecting the albumin solution to anion exchange chromatography in order to yield an albumin-containing anion exchange product;
 - (2) subjecting the albumin-containing anion exchange product, with or without intervening purification steps, to cation exchange chromatography run in the negative mode with respect to the albumin to yield an albumin-containing cation exchange product; and
 - (3) placing the albumin-containing cation exchange product, without further purification, into a final container for therapeutic use,
- wherein, prior to the cation exchange step, the albumin solution undergoes at least one step selected from the group consisting of: buffer exchange; concentration; dilution; dialysis; diafiltration; pH-adjustment; treatment with a reducing agent; decolouration

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treatment; heating; cooling; and conditioning.

CI
CODT.
Claim 112 (previously added): A process according to Claim 111 wherein the initial albumin solution contains glycosylated albumin and the glycosylated albumin is bound during the said cation exchange step.

Claim 113 (previously added): A process according to Claim 111 wherein prior to the cation exchange step the albumin solution undergoes at least one step selected from the group consisting of: (i) pH-adjustment; (ii) concentration; (iii) diafiltration; and (iv) conditioning by addition of a fatty acid.
